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LETTER TO THE EDITOR

Gene Expression Changings After Bariatric Surgery in Morbid Obese Patients and Type 2 Diabetes Remission

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We studied the article by Fonseca et al. [1] and we commend the authors on their findings. Obesity is a key factor contributing to the development of type 2 diabetes mellitus. Weight loss is associated with improvement of type 2 diabetes. Bariatric surgery is the most useful method for the treatment of obesity and type 2 diabetes [2]. Improvement of type 2 diabetes can be observed even before significant weight loss after bariatric surgery [2].

Fonseca et al. [1] showed that the over-expression of *GHRL* (ghrelin and obestatin prepropeptide) gene occurs in the excluded stomach, after bariatric surgery, but does not have a correlation to T2DM remission [1]. Expression of many genes and molecular pathways changes after bariatric surgery [3, 4]. In this letter, we mentioned the changes of other gene expressions (in addition to *GHRL*) in obese subjects with type 2 diabetes after bariatric surgery.

After bariatric surgery (RYGB), intestinal expression of regenerating pancreatic islet-derived protein-encoding genes (REG) such as *REG1*α and *REG3*γ expression in the jejunum enhance and affect postoperative type 2 diabetes remission by playing an endocrine function [2].

Also, the expression of some genes (implicated in lipid metabolism, obesity, and/or type 2 diabetes) after two types of bariatric surgery, including Roux-en-Y gastric bypass surgery (RYGB) and sleeve gastrectomy (SG), changes. The expression of gamma-glutamyl transferase 1 (*GGT1*), cathelicidin antimicrobial peptide (*CAMP*), alpha defensin 1 (*DEFA1*), lipocalin 2 (*LCN2*), tumor protein p53 (*TP53*), prenyl (decaprenyl) diphosphate synthase subunit 1 (*PDSS1)*, oxidized low-density lipoprotein receptor 1 (*OLR1*), contactin-associated protein-like 5 (*CNTNAP5)*, 24-dehydrocholesterol reductase (*DHCR24*), and sarcosine dehydrogenase (*SARDH)* decreases and the expression of hedgehog acyltransferase (*HHAT*) increases [4]. Mentioned study was not powered to compare these two types of surgery, but the subjects who underwent RYGB surgery had more weight loss and resolution of type 2 diabetes than the SG surgery subjects [4]. Also, three clinical traits (body weight, fasting plasma glucose, and glycosylated hemoglobin content) were correlated with the changes in expression of seven transcripts including WD repeat 35 protein (*WDR35*), DICER1 antisense RNA 1 (*DICER1-AS1*), 24-dehydrocholesterol reductase (*DHCR24*), tigger transposable element derived 7 (*TIGD7*), DNA topoisomerase II binding protein 1 (*TOPBP1*), teashirt zinc finger homeobox 1 (*TSHZ1*), and family with sequence similarity 8 member A1 (*FAM8A1*) [4].

Park et al. showed growth factor receptor-bound protein 14 (GRB14), glycerol-3-phosphate dehydrogenase 1 (GPD1), and growth differentiation factor 8 (GDF8), in muscle from morbidly obese women, significantly decreased approximately 2.4, 2.2, and 2.4 fold respectively, after weight loss (gastric bypass). These modulations would be expected to improve insulin signaling [5].

A variety of acute-phase reactants (such as C-reactive protein) have increased in subjects with obesity and type 2 diabetes [6]; while some of them, such as CAMP and alpha defensin 1/3 (DEFA1/DEFA3), have decreased in women following bariatric surgery from 55 to 60% [4].

The expression of microRNA-448 (miR-448) and sirtuin 1 (its target gene) is potential critical factors that can predict surgery efficacy in obese type 2 diabetes patients. Decreased

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expression of miR-448 and increased expression of sirtuin 1 associated to increase of insulin sensitivity can serve them as prognostic indicators for obese type 2 diabetes patients after laparoscopic bariatric surgery [3].

Our study indicates the expression of some genes changes after bariatric surgery. Increase or decrease of genes expression is associated to type 2 diabetes remission of morbid obesity after bariatric surgery. Although there are not enough studies, the assessment of these changes and associating with type 2 diabetes remission can perhaps help to understand molecular mechanisms involved in this process.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

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